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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

U. S. PATENT OFFICE

Improvements in or relating to Filter Elements

We, **OZONAIR ENGINEERING COMPANY LIMITED**, a British Company, of Ozonair Works, The Esplanade, Rochester, in the County of Kent, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to filter elements of the general kind already described in our co-pending Application No. 33542/59 (Serial No 969326) and has for an object to provide a simple element for a filter for air or other gases which, in addition to being inexpensive to manufacture and capable of ready replacement, is made with a reinforcement so that it is suitable not only for ordinary installations having pad-type elements, but may also be employed in filters in which a roll of filter material is passed through the filter from one drum to another and in the course of this travel undergoes appreciable tensile stresses.

According to the invention, a method of making a filter element comprises arranging a web of reticulated material as a conveyor band passing over a work platform, applying to the band first a binder, and then randomly arranged fibres; and applying further binder to both the fibres and the band to bind them together.

After the second application of binder, the filter element may conveniently be submitted to a curing operation if this is necessary by reason of the nature of the binder.

During the second application of binder a current of air may, with advantage, be passed through the fibres to induce even distribution of the fibres and penetration of the binder therethrough.

The fibres may be applied to the binder-

[Part 4a. 6d.]

covered band by gravity from a hopper, and a convenient binder is rubber latex.

The invention also includes an element for a filter for air or other gases, comprising a mass of randomly entangled filamentary material arranged on a reticulated reinforcement and secured to one another and to the reinforcement by a binder.

To make a roll of filter material intended for a filter installation in which a clean roll in one part of the machine is passed in a serpentine path around rollers to a take-up roll in another part of the machine, and in such travel is subjected to appreciable tensile stresses, the filter element is of considerable length. It will be appreciated, therefore, that the method of manufacture whereby the reinforcement is employed as a conveyor band during the actual fabrication of the filter element results in a very economical method of manufacture.

One embodiment of the invention will be described with reference to the accompanying drawings, which show a perspective diagrammatic view of apparatus for making filter elements.

Referring to the drawings, a reinforcing band 10 is conveniently of scrim, or other loosely woven reticulated material, and is arranged on a supply reel 11, from which it is caused to pass around a roller 12 and across a work platform 13. The actual manufacture of the element takes place on the work platform 13, and as the reinforcement begins to pass on to that platform it is subjected to spraying as indicated at 14 from a nozzle 15 with rubber latex to serve as a binder and to collect fibres and cause them to travel along with it. The fibres, which may be cattle hair, glass fibre, vegetable fibres, or other suitable material,

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are contained in a hopper 16, from which they are released by gravity on to the reinforcing band travelling underneath after it has been subjected to spraying with the binder, and in consequence thereof the fibres attach themselves randomly to the reinforcing band 10, as indicated at 17. The hopper 16 is arranged to deliver sufficient fibres to give the required thickness, as indicated at 18 to the filter element. After the band 10 has passed the hopper 16, a further application of rubber latex solution from a nozzle 18 is made to both band and fibres, and at the same time an air flow is induced from an air nozzle 19 through the filter element, so as to bring about even distribution of the fibres and to ensure that the binder penetrates adequately through them. The reinforcing band 10 then continues along the work platform 13 and passes through a drying oven 20, whereby the latex solution is cured. The time and temperature for drying will, of course, be easily determined according to the characteristics of the fibre and binder employed.

After the element has passed out of the drying oven, it is wound around a guide roller 21 and on to a take-up reel 22, which then presents a finished element that can be cut off to the required length and is then ready to be employed in a filter installation, the take-up reel 22 used during manufacture being capable of being employed as a storage reel until use and then as a dispensing reel in use. It will be seen, therefore, that the element can be produced with the minimum of steps.

Instead of being employed as a filter element in roll form, the emerging element can, if desired, be subsequently removed from the take-up reel and cut into pads for use in other types of filter.

Other binders, such as polyvinyl acetate,

alkyd resins, polyester resins, and urea- and phenol-formaldehyde condensates may also be employed.

WHAT WE CLAIM IS:—

1. A method of making a filter element, comprising arranging a web of reticulated material as a conveyor band passing over a work platform, applying to the band first a binder, and then randomly arranged fibres; and applying further binder to both the fibres and the band to bind them together.

2. A method as claimed in Claim 1, wherein after the second application of binder the filter element is submitted to a curing operation.

3. A method as claimed in Claim 1 or Claim 2 wherein during the second application of binder a current of air is passed through the fibres to induce even distribution of the fibres and penetration of the binder there-through.

4. A method as claimed in any preceding claim, wherein the fibres are applied to the binder-covered band by gravity from a hopper.

5. A method as claimed in any preceding claim, wherein the binder is rubber latex.

6. A method as claimed in any of Claims 1 to 4, wherein the binder is polyvinyl acetate, or an alkyd resin, or a polyester resin or a urea- or phenol-formaldehyde condensate.

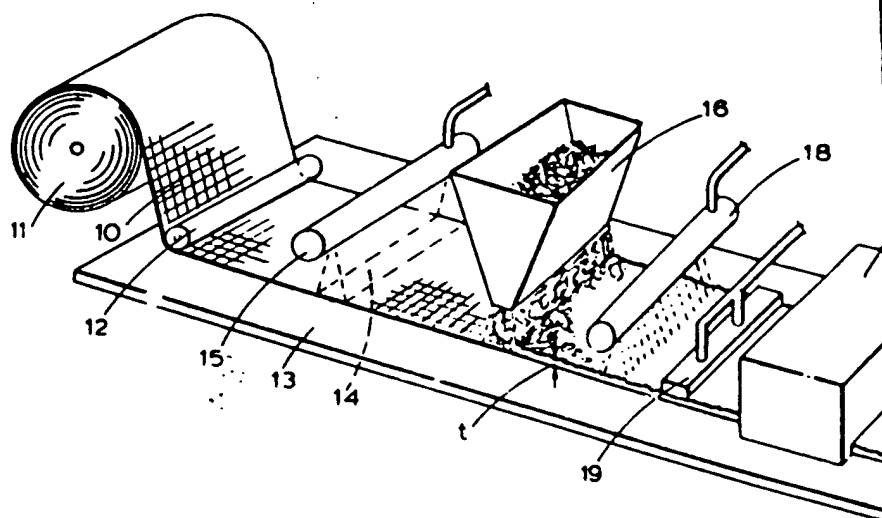
7. A method of making a filter element substantially as hereinbefore described with reference to the accompanying drawings.

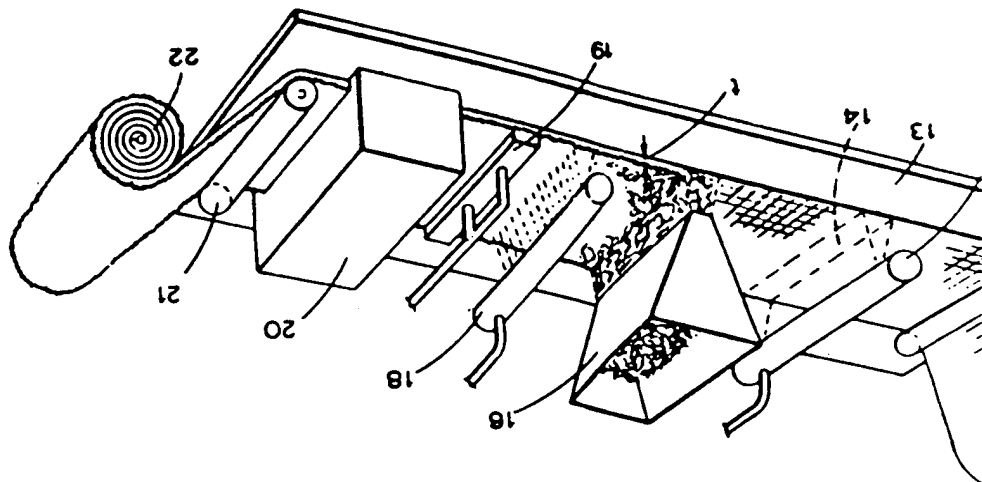
8. An element for a filter for air or other gases comprising a mass of randomly entangled filamentary material arranged on a reticulated reinforcement and secured to one another and to the reinforcement by a binder.

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